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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,103	08/22/2001	Chang Je Cho	P/2803-42	9636

2352 7590 03/20/2002

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EXAMINER

~~MONDT, JOHANNES-P~~

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 03/20/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/914,103

Applicant(s)

CHO, CHANG JE

Examiner

Johannes P Mondt

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. ~~Acknowledgment is made of applicant's claim for foreign priority based on an~~
application filed in Paper No. 3 on 08/22/01. It is noted, however, that applicant has not
filed a certified copy of the application for a patent in Korea as required by 35
U.S.C. 119(b).

Claim Objections

2. ***Claim 1*** is objected to because of the following informalities: "dispersed layer"
should be replaced by "layer", since this layer is itself not "dispersed" but instead only
contains particles that are dispersed within said layer. **Appropriate correction is
required.**

Specification

Applicant's statement that his invention contradicts the second law of
thermodynamics and the rectifying function of the device as being able to operate
without supply of energy are unsubstantiated, considering the absence of a plot of
entropy as a function of time or the equivalent of it. Applicant should provide that plot in
a manner that enables a straightforward verification of said statement or withdraw all
reference to the device as a rectifier and the rectifying function of said device in the
sense given to this term by Applicant, namely as a device and function, respectively,
capable of defying the second law of thermodynamics, to operate without the supply of
energy, or the physical equivalent of such statements. **Appropriate action is required.**

In spite of the lack of substantiation of aforementioned statement the physical constitution of the device as claimed can be searched for prior art, upon which the following art rejections are based.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. ***Claims 1-3 are rejected*** under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The capability of the “rectifier” device of claims 1 – 2 and the “method for converting thermal energy into electrical energy by rectifying thermally moving electrons by utilizing a rectifier” of claim 3 of Applicant to convert thermal electron energy into electrical energy through violation of the law of thermodynamics (see pages 4 – 6 in particular), while critical or essential to the practice of the invention, but not included in the claims, is not enabled by the disclosure. In particular, in Applicant’s disclosure there are no verifiable data on the behavior of entropy of the system of Applicant as a function of time. Thus far, during worldwide experimentation ever since the formulation of the second law of thermodynamics, no reproducible violation has ever been found. This fact a fortiori requires Applicant to provide the aforementioned verifiable data as a necessary requirement for enablement. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

Claim Rejections - 35 USC § 101

5. ~~35 U.S.C. 101 reads as follows:~~

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The claimed invention lacks patentable utility. In the absence of reproducible data in support of Applicant's statement that the "rectifier" device of claims 1 – 2 and the "method of converting thermal energy into electric energy by rectifying thermally moving electrons by utilizing a rectifier" of claim 3 violate the second law of thermodynamics, said "rectifier" device of claims 1 – 2 and said "method" of claim 3 lack enablement, as detailed above under item 4. In view of this lack of enablement, said "rectifier" device of claims 1-2 and "method of converting thermal energy into electric energy by rectifying thermally moving electrons by utilizing a rectifier" are also lacking in patentable utility.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. ***Claim 1*** is rejected under 35 U.S.C. 102(b) as being anticipated by Schoch, Jr. et al (5,250,388). Schoch, Jr. et al teach a system including elements that exert a rectifying influence on electrons including those having thermal movements, hence a

rectifier of thermally moving electrons, specifically a junction field effect transistor (cf. column 12, line 9) comprising (cf. Fig. 9):

~~a metal layer 116 (cf. column 12, line 10);~~

an insulating, - i.e., electron movement barrier, layer 114 (cf. column 12, lines 9-10) contacting said metal layer (see Fig. 9);

a ("dispersed"; see claim objection) layer 120 of minute metal particles in which said particles are uniformly dispersed, namely in the form of a first conductivity type (in the present case selected as n-type, which is patentably indistinguishable from the p-type selection) metal-doped (e.g., doped by alkali metal ion particles, cf. column 5, lines 35-36) polymer layer (cf. column 12, lines 11-12);

a semiconductor layer 122 (the semiconductor being a p-doped polymer, the polymer being selected out of a list of polymers given in column 5, lines 10-24; Applicant is reminded that for instance p-type polyacetylene is a semiconductor; see Japanese Patent JP402051283 to Iwamoto et al, which patent only is mentioned here to provide information that is generally known: the semiconductor properties of p-type polyacetylene are inherent) contacting said ("dispersed") layer of minute metal particles (cf. Fig. 9);

a metal layer serving as an ohmic (contact) layer 124 contacting with said semiconductor layer (cf. Fig. 9).

Schoch, Jr., et al do not necessarily teach a second metal layer contacting said ohmic (contact) layer. However, it is an inherent property of electronic sub-systems such as the electronic circuit of Schoch, Jr. et al to be connected to outer electrodes in

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order for said electronic circuits to function, and as such the aforementioned second metal layer must be present, although Schoch, Jr. et al does not mention it specifically.

~~Furthermore, it is well known in the art of solid-state device physics that all metal layers inherently consist of an aggregate of minute rectifying surfaces, namely all monolayers out of which said metal layers consist: each monolayer rectifying the continuous spectrum of admissible momentum values to those commensurate with the crystal lattice dimensions (see, for instance: J.M. Ziman, F.R.S., "Principles of the Theory of Solids", Cambridge University Press, Second Edition, 1972; particularly, Chapters 1 and 3. This reference is given not within the context of an obviousness argument, but instead for the purpose of substantiating the examiner's statement).~~

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. ***Claim 2-3*** are rejected under 35 U.S.C. 103(a) as being unpatentable over Schoch, Jr. et al (5,250,388) in view of Goronkin et al (5,049,951).

With regard to claim 2: As detailed above, Schoch, Jr., et al anticipates a rectifier of thermally moving electrons. Schoch, Jr., et al do not necessarily teach the limitation as defined by claim 2. However, the use of a superlattice buffer has long been recognized in the field of junction field effect transistor technology, which is the art of

Fig. 9 of Schoch, Jr., et al as cited above. This long-recognized use is witnessed, for example, by U.S. Patent to Goronkin et al, who teach a superlattice as a component of a (hetero-) junction field effect transistor (cf. title and abstract), said superlattice comprising alternating barrier and quantum well layers (cf. abstract, second sentence) with parallel surfaces, i.e., the rectifying surfaces all have the same direction.

Furthermore, all rectifying surfaces are insulated from each other by virtue of the superlattice structure, which is a plurality of layers, so that quantum wells and a barrier layers are alternately stacked. Said rectifying surfaces are in an incomplete (barrier) state with (and are connected electrically to) one collimating electrode (through the source and drain: said superlattice structure is a channel structure). The purpose, as stated specifically by Goronkin et al, of the superlattice is inter alia improved charge carrier confinement in a junction field effect transistor. This purpose is obviously also valid for the junction field effect transistor taught by Schoch, Jr., et al, while the similarities between the devices warrant the expectation that also the production cost would be positively effected by the implementation of the superlattice taught by Goronkin et al in the junction field effect transistor as taught by Schoch, Jr., et al. Therefore, it would have been obvious to one of ordinary skills in the art to modify the invention as defined by Schoch, Jr. et al at the time it was made so as to include the limitation as defined by claim 2.

With regard to claim 3: The devices of claims 1 and 2 would necessarily have to be used in order to function. Claim 3 fails to further limit the devices of claims 1-2 other than simply stipulate their use.

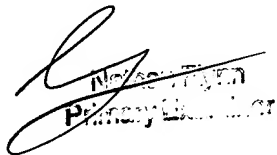
Conclusion

~~Any inquiry concerning this communication or earlier communications from the~~
examiner should be directed to Johannes P Mondt whose telephone number is 703-306-0531. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 703-308-6601. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

JPM
March 13, 2002


Johannes P. Mondt
Primary Examiner